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09/884,340	06/20/2001	Akira Kunimoto	KUW-044	2932

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EXAMINER
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TUNG, TA HSUNG

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 08/01/2003

5

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/884,340

Applicant(s)

KUNIMOTO

ETAL

Examiner

T. TUNG

Group Art Unit

1753

Paper No. 5

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- ☐ Responsive to communication(s) filed on \_\_\_\_\_
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) 1-24 is/are pending in the application.
- ☐ Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- ☒ Claim(s) 1-24 is/are rejected.
- ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement

## Application Papers

- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☒ All ☐ Some\* ☐ None of the:

- ☒ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
- ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other \_\_\_\_\_

Office Action Summary

Art Unit: 1102

Claims 1-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 4, the “electrolyte substrates” are inconsistent with “said....substrate” at lines 7, 10, 14 and 18 of the claim. Which of the substrates is “said....substrate”?

Claim 1, lines 10-11, “active to at least oxygen” is seen to be misdescriptive of the reference electrode in that the specification appears to disclose the reference electrode 12 only to be active to oxygen.

Claim 1, lines 25-26, the “inorganic porous member” should be pointed out to comprise a catalyst for promoting the oxidation of the reducing gas recited at lines 31-32 of the claim. Otherwise, the inorganic porous member would be devoid of any function or purpose.

Claim 2, lines 2-3, the parenthetical expression is redundant and should be cancelled.

Claim 4, line 5, --a-- is needed before “second”.

Claim 4, lines 2-5, the wording suggesting that the first gas treatment chamber can be formed across the gas detection chamber and a second gas treatment chamber is not understood. Also, the basis for this structure in the disclosure is not evident. In fact, it is not even clear where is the basis for a second treatment chamber.

Claim 6, line 5, “and/or a compound” is indefinite. First, “and/or” is not proper Markush language. Second, “compound” is redundant when each member of the Markush group is already a compound.

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Claims 9 and 10, line 2 of each, “to be” should be cancelled, since parent claim 7 already recites the porous member to carry the catalytic precious metal.

Claim 12, line 2, “said anode electrode....” does not have antecedent basis. Also, this claim suggests that an anode electrode of the oxygen supplying pumping cell is also the anode of the oxidation catalyst pumping cell, or these two cells are one and the same. Where is the basis for that?

Claim 15, lines 2-3, “to be added to” should be changed to --of--, since parent claim 13 already recites the oxygen-ion-conductive solid electrolyte.

Claim 16, line 2, “said cathode electrode...” does not have antecedent basis. Also, line 3, “said oxidation catalyst pumping cell” does not have antecedent basis, since this claim is dependent upon claim 2, not claim 11. Further, the language of this claim suggests the combination of the oxygen supplying pumping cell and the oxidation catalyst pumping cell into one cell. Where is the basis for that?

Claim 16, last line, the cathode is recited to be in a duct communicating with the gas to be detected. From the drawings (e.g. figures 2 and 7), cathode 17 appears to be in a duct 22 communicating with air (see page 17, line 23 of the specification) rather than the sample gas.

Claim 17, line 3, “said cathod electrode of said oxidation catalyst pumping cell” does not have antecedent basis. This claim depends upon claim 2 via claim 16, and does not depend upon claim 11.

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Claim 19, line 4 calls for “substrates”, while lines 7, 10, 14 and 18 call for “said....substrate”. Which one of the substrates is the said substrate?

Claim 19, lines 10-11, “active to at least oxygen” is seen to be misdescriptive if the reference electrode is active only to oxygen.

Claim 19, last paragraph, “means for measuring a potential difference....while converting NOX in the gas to be detected” suggests that the means for measuring the potential difference is the same means responsible for converting NOX in the gas to be detected. Since the means for measuring a potential difference is merely a voltmeter (e.g. 30, 31), it is not evident how it can function to convert the NOX in the gas to be detected.

Claim 22, line 2, “said NOX detection cell” does not have antecedent basis. Note that parent claim 1 recites “a NOX sensing cell” at line 5.

Claim 23, line 3, “said NOX detection cell” does not have antecedent basis.

Claim 23, lines 4-5, which one of the substrates is this “substrate”?

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over DE 19852247 in view of Japan 11-23526.

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US 6,319,377 to Hasei et al appears to be an English language equivalent of DE '247 and will be referred to for convenience. Similarly, 6,303,011 to Gao et al appears to be an English language equivalent of Japan '526 and will be referred to for convenience.

Hasei discloses a NOX sensor comprising a gas detection chamber 18 with NOX conversion pumping cell 3 and NOX sensing cell 4. There is also an oxygen pumping cell 9 between cells 3-4 and a sample gas opening 10. See figure 1; col. 4, line 29 to col. 6, line 34. Applicant's claims differ by calling for a porous catalyst material arranged between the cells 3-4 and the gas opening.

Gao discloses a NOX with an oxidation catalyst 111 in a treatment chamber between a gas opening 110 and a pumping cell 108-a NOX sensing cell 104-105. See figures 5 and 7; col. 7, line 21 to col. 11, line 50. It would have been obvious for Hasei to adopt the oxidation catalyst of Gao, since the two patents are totally analogous, and there is no unexpected result. This oxidation catalyst, of course, would oxidize any interfering reducing gases such as hydrocarbons.

The gas chamber 18 in Hasei can be regarded to constitute a treatment chamber at the left hand side near the gas opening and a detection chamber at the right hand side where the cells 3-4 are. In any event, Gao in figure 7 shows a treatment chamber and a detection chamber separated by a diffusion opening 121.

In regard to claim 11, since the oxidation catalyst is a metal conductor and is in contact with pumping electrode 103, it will inherently act as an oxidation catalyst electrode.

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Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over DE '247 in view of Linder et al or Ep 517366 and Japan '526.

DE has been described in the previous rejection. Applicant's claims differ by calling for an oxidation catalyst in a treatment chamber before the gas detection chamber.

Linder discloses a Pt catalyst 16 arranged before a solid electrolyte sensor to react with reducing gases and bring a sample gas to equilibrium. See figures 1-2; col. 1, lines 17-50 and col. 3, line 4 to col. 4, line 59.

Ep discloses a NOX sensor wherein an oxidation catalyst 17 (e.g. Pt, Pd) is disposed before the sensing electrodes to oxidize any interfering reducing gases but not NOX. See col. 3, line 7 to col. 4, line 56.

Japan discloses a NOX sensor with an oxidation catalyst arranged in a treatment chamber before the detecting cell, as discussed before.

It would have been obvious for DE to adopt an oxidation catalyst to react with reducing gases other than NOX in view of Linder or Ep so as to eliminate interfering gases. It would have been further obvious to locate this oxidation catalyst in a treatment chamber separated from the detection chamber where the detection electrodes are in view of Japan so as to segregate the treatment process from the detection process and prevent any untreated gas from reaching the detection electrodes.

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In regard to claim 11, since the metal catalyst is a conductor and is in contact with the pumping electrode in the treatment chamber, it will inherently act as an oxidation catalyst electrode.

In the specification, page 10, last line, "the wall...." is not understood. Applicant should also check the specification for other informalities.

The examiner can be reached at 703-308-3329. His supervisor Nam Nguyen can be reached at 703-308-3322. Any general inquiry should be directed to the receptionist at 703-308-0661. A fax number for TC 1700 is 703-872-9310.



Ta Tung

Primary Examiner

Art Unit 1753